French Creek Responses to Comments:

Comments have been grouped into 2 major groups: those that are supportive or for the project (labeled with “a”) and those that are opposed (labeled with “b”) the project. Other comments that neither were for or against the project but were characterized as being questions directed to FWP are also included. All comments received are listed in Appendix A.

Summary of Comments Supporting the

French Creek Native Fish Restoration Project:

Comment Category 1A: Conservation of Native Species.

Comment 1a. *Grayling conservation has been going on in Big Hole for last 20 years. The common denominator through these efforts has been shared sacrifice. Some have given water, others grass and hay through a riparian fence, others cash through installation of water wells and more efficient irrigation that have annual electrical costs. Each project is a piece in a larger puzzle to conserve Arctic grayling and it has been working. I applaud those who are willing to step up and do what it takes to restore sensitive fish.*

FWP concurs with this comment. There have been many projects completed in the Big Hole over the last 25 years to improve habitat and enhance native fisheries. Nearly all of which have also required some sort of landowner contribution. And they have worked. While grayling numbers fluctuate with dry and wet cycles their overall numbers have increased over the past 25 years.

Comment 2a. *Cutthroat are in only 6% of their historic range. If mule deer plummeted and were on verge of extinction in the Big Hole, I am sure that 99% of citizens would demand action to protect the species. Why would these same people not want to protect the native cutthroat and grayling? One of the unintended consequences of the introduction of non-native fish a century ago has been the decline of native fish species. This project aims at reversing those impacts. 50 years ago westslope cutthroat were plentiful in some streams. Now it is rare to catch one anywhere in the Big Hole. Without these projects cutthroat will go extinct.*

FWP concurs with this comment. Unlike with big game restoration where native fauna like elk and big horn sheep were reintroduced after being extirpated around the turn of the last century, fisheries managers imported non-native trout to replace depleted stocks of native cutthroat and grayling. One of the unintended consequence of this approach was the eventual demise of native fisheries. Cutthroat are in less than 6% of their historic range in the Big Hole and continue to decline.

FWP is seeking for a balanced fisheries management approach. FWP will continue to manage the vast majority of our waters as non-native brown, brook trout and rainbow trout fisheries. The long-term goal is to manage 80% of the available habitat for non-native trout fisheries and seek to restore native fish to 20% of their historical range. FWP believes this is an equitable management approach and one that will continue to provide for ample recreational opportunities to catch non-native trout but still conserve our native fish for future generations.

Comment 3a. *I value the opportunity to catch cutthroat and want this for future generations to also enjoy. Ralston Ranch has participated in grayling conservation and supports the restoration of French Creek. We are 4th generation ranchers (1866) on Deep and French Creeks and are excited to see native fish restored to French Creek. My grandchildren will be able to enjoy the same stream and fish that their great grandfather did when he settled here.*

FWP agrees with this comment. Once a species is extinct they cannot be brought back. These projects will ensure that native fish are not lost and that future generation can enjoy angling for native cutthroat and grayling.

Comment 4a. *Arctic grayling have been lost in all other places where they existed in the lower 48 states except for the Big Hole. I am excited to see Arctic grayling exist as they evolved, without brook trout.*

It is true that the Big Hole River is the last remaining location where fluvial (river dwelling) Arctic grayling exist. Grayling were formerly native to the entire upper Missouri River system. They were also native to the upper peninsula in Michigan. They are now gone from all of these places except for the Big Hole. Projects like the French Creek project have the potential to ensure that grayling will persist into the future. French Creek would represent the only location in the Big Hole drainage where fluvial grayling would exist in the absence of non-native fish species. The French Creek project could provide valuable information on the potential interactions between grayling and non-native fish species.

Comment 5a. *This project may sound drastic, but brook trout are an invasive species and have wiped out the native fish. I do not take the removal of wildlife lightly, but errors in past management have resigned us to this option.*

Brook trout are not considered an invasive species. Brook trout are a highly valued game fish and FWP regularly manages for brook trout fisheries across areas where they have been introduced. One of the unintended consequences of brook trout introduction more than 100 years ago has been the loss of native fisheries, in particularly the westslope cutthroat trout. Brook trout compete with and prey upon westslope cutthroat trout at the juvenile stage (See comment 13b) and eventually completely displace native populations. The only tool that has been proven successful to date in reversing this trend is to remove the non-native fish. Once removed, native fish thrive.

FWP does not take the removal of fish species in a specific stream lightly either. Careful consideration is given when selecting a stream for native species restoration. The location of projects is determined by habitat conditions, landownership, current species composition, the feasibility of the project and suitable fish barrier locations among other factors.

FWP does not consider the introduction of non-native fish that occurred over 100 years ago an error in past management. Non-native trout introduction has resulted in the creation of nearly all the highly valued fisheries in southwest Montana today. These fisheries provide both intrinsic, recreational and economic value to residents and non-residents of Montana. However, it was not known at the time when non-native fish were introduced that they would be a factor in the decline and near extirpation of native fisheries. These unintended consequences have led to the proposal to restore native fish to French Creek and the other restoration projects that are ongoing today across Montana and other states. FWP is seeking to restore some streams to native species and managing the rest for non-natives will remain a high priority.

Comment 6a. *It is incumbent on society to restore native fish species.*

FWP agrees that native fish conservation is important. Cutthroat trout is Montana's state fish and without projects like these are in danger of local extirpation. Further, FWP is mandated by statute to implement programs that manage sensitive fish species in a manner that assists in the maintenance or recovery of those species, and that prevents the need to list the species under the federal Endangered Species Act (see Comment 12b).

Comment 7a. *French creek has a high probability of success with a very low probability of adverse effects. French Creek restoration will be inconvenient in the short-term (2-5 years) but the long-term benefits are much greater.*

FWP agrees. There is a high probability of success of this project. Given the projects that have been done previously and the advances in the techniques available FWP is confident that native fish restoration in the French Creek drainage can be achieved. It is true that a fishery will be more or less absent from French Creek for a period of a few years (See Comment 18b), but once native fish are restored they would become self-sustaining and provide a native fishery that would be present nowhere else in the Big Hole and in only one other place which is in Yellowstone Park.

Comment 8a. *Most conservation organization in the area support the project.*

This is true. Skyline Sportsmen, Anaconda Sportsmen, George Grant Trout Unlimited, The Big Hole Watershed Committee and the Big Hole River Foundation have all submitted comments in support of the French Creek native fish restoration project.

Comment 9a. *Guiding community recognizes the importance of conserving native fish and supports these projects.*

FWP received 5 comments from individuals who identified themselves as outfitting or guiding on the Big Hole River or a having done so in the past. Four were in favor of the project and 1 was opposed.

Comment 10a. *Project will create a safe haven for native species that is publicly accessible. In order to do native fish restoration, you have to have a fish barrier.*

Non-native fish are the number 1 factor currently affecting native cutthroat trout range-wild. While other factors such as habitat degradation and over harvest contributed to the decline of native fish more than 100 years ago, today the primary driver of declining native cutthroat stocks are non-native fish. Numerous projects conducted over the past 25 years to conserve westslope cutthroat trout have demonstrated that without a fish barrier that prevents non-native fish from recolonizing the stream, the benefits of restoration are only short term. Non-native fish that recolonize the stream will eventually out-compete and prey upon native cutthroat until their numbers begin to decline. However, with a fish barrier in place a “safe haven” is created where non-native fish no longer have access to the stream. In the absence of non-native fish, cutthroat trout have been shown to thrive.

Comment 11a. *Cutthroat numbers are declining in the Big Hole (outfitter).*

Cutthroat trout in the Big Hole River are rare. No population estimate information is available for cutthroat because too few are captured to obtain reliable population statistics. However, cutthroat trout are most common in the river around tributary streams that still contain remnant populations such as Jerry Creek near Wise River. Also, in the spring of 2018 six westslope cutthroat trout were captured in the Melrose Section of the Big Hole River which is adjacent to the westslope cutthroat trout restoration project that occurred in Cherry Creek. It is likely that through the restoration of tributary streams like French Creek that cutthroat trout will become more common in the Big Hole.

Comment Category 2A: Cutthroat trout and Arctic grayling fisheries

Comment 12a. *Cutthroat and grayling will produce a better fishery with larger fish than brook and rainbow fishery now. I have fished where native species have restored and can attest to better fishing. There are no 15-17-inch fish in small streams.*

Fisheries data from 2 restored cutthroat trout streams (McVey Creek (Big Hole) and Cherry Creek (Madison River)) suggest that cutthroat trout do produce a fishery with slightly larger fish. Brook trout, because of their high reproductive rate, tend to overpopulate which results in reduced growth. Densities of cutthroat trout in restored fisheries also has been show to at least initially meet or exceed non-native fish density after the project is complete (see Comment 17b).

In small streams food, temperature and available habitat dictate fish size. Generally small streams do not contain resident fish over 12 inches. (For a review of the fish and their sizes in French Creek and its tributaries see Comment 22b).

Comment 13a. *If one wanted to catch a mess of brook trout it could be done in many streams in the Big Hole including Deep Creek. That will not change.*

FWP concurs with this comment. Brook trout in the Big Hole drainage and its tributaries are widespread and abundant. There are no tributaries in the drainage that do not have a brook trout fishery. There will be no changes in the fishery in Deep Creek (see comment 12b). Cutthroat trout on the other hand exist only in few isolated streams generally at the headwaters.

Comment 14a. *As outfitter, I support this project. Clients know the Big Hole is the only river you can catch rainbow, brown, brook and cutthroat trout and Arctic grayling in one day which is known as the Big Hole "Grand Slam". Big Hole River fishery will be enhanced with more native fish present. French*

Creek will wind up putting more cutthroat trout and grayling into the Big Hole River. I have caught westslope cutthroat trout in the lower Madison River which came out of Cherry Creek.

The Big Hole river provides a very diverse salmonid fishery. It is the only river in the lower 48 states where an Arctic grayling can be caught. Restoring Arctic grayling and westslope cutthroat trout to French Creek will likely increase the numbers of these 2 fish in the Big Hole River as the creek reaches its carrying capacity and fish migrate downstream looking for additional habitat. These fish will become residents of lower French Creek, Deep Creek and the Big Hole River.

Comment 15a. *The cutthroat and grayling that leave French Creek and go to the Big Hole will be big enough to compete and survive with non-native fish.*

FWP concurs with this comment. Studies have shown that brook trout obtain their completive advantage because of when they spawn. Brook trout spawn in the fall and their eggs lay in stream gravels all winter and hatch in early spring (April and May). Westslope cutthroat trout do not spawn until June and the fish do not emerge from the gravels until mid to late August. By that time brook trout have grown to the size where they are competitively superior and can prey upon the recently emerged cutthroat. Brook trout gain the advantage over cutthroat at this early life stage. Once a cutthroat has survived its first year, it can complete with brook trout. The cutthroat and grayling that spill over the fish barrier will likely be age-1 and older fish which should be able to compete for food and other resources with non-native fish in lower French Creek, Deep Creek and the Big Hole River.

<u>Comment Category 3A: Endangered Species Act</u>

Comment 16a. *Impacts of the Endangered Species Act (ESA) on landowners and land managers is real and significant. ESA hamstrings management of land. These projects will lessen the chance of listing of either species under the Endangered Species Act. Projects that benefit these native fish species benefit all people in the Big Hole because they lessen the chance of the fish being listed. Stakeholders in the Big Hole will suffer if Arctic grayling or westslope cutthroat are listed.*

With both Arctic graying and westslope cutthroat trout existing in less than 7% of their historic range in the upper Missouri River drainage, they are species that could be petitioned to be listed under the Endangered Species Act. Recent rulings have precluded both species from being listed (Arctic grayling is being appealed) because of the work done at the local level to conserve these native fish. The Endangered Species Act can have significant impacts on all actions that have a federal nexus including any action that is supported all or in part by federal funding including grazing on federal lands, water withdrawals on federal lands, funding of farm and ranch subsidies such as the EQIP program, federal grants, construction of highways, funding for fish and wildlife agencies among others. FWP is mandated to keep species from warranting listing under the ESA. FWP believes that keeping management authority local is the most effective way to ensure continued wise use or our resources.

Comment 17a. *The French Creek project was included in the recent decision to not list Arctic grayling as Threatened on the Endangered Species list.*

The French Creek native fish restoration project was included in the recent decision by the US Fish and Wildlife Service to not list Arctic grayling as a Threatened Species under the ESA. The French Creek project among many others along with the cooperation that has occurred between state and federal partners, conservation groups and private landowners all played into the decision to not list the fish. This decision is currently being litigated.

Comment 18a. *Short term concerns about the projects are outweighed by the long-term benefits of keeping fish from being listed.*

FWP agrees that there are some short-term and minor impacts of the proposed project but that the long-term benefits greatly outweigh the potential impacts.

Comment 19a. *Landowners are part of a community. I applaud those willing to stand up and do what it takes to recover sensitive fish. If the fish are listed, it could change life for everyone in the valley.*

FWP concurs. See answer to 16a for a list of potential impacts.

Comment Category 4A: Rotenone is safe to use for fisheries management

Comment 20a*.* *Science suggests the use of rotenone is safe. Rotenone breaks downs quickly and is not persistent in the environment. Rotenone has been proven effective and not harmful to the ecosystem as whole. FWP has a proven track record for native fish conservation. The French Creek project is well conceived and well planned and appropriate safe guards have been put in place. Rotenone is safe for mammals (including people), birds and other non gill-breathing animals. Impacts to aquatic invertebrates are reversed in only 12-18 months after treatment.*

FWP concurs with these comments. Please see Comment 1b-11b for additional discussion)

Comment 21a. *After April 27th meeting I researched rotenone. I asked my brother who is a fish biologist in Maine about rotenone and he said they used to eat the fish killed with rotenone. His one concern was how to keep the rotenone from going downstream. Are you using potassium permanganate? I have personally applied garden pesticides with rotenone. I have put them on vegetables, could it be that horrific? It has also been used for removing pests on livestock. People around the world use rotenone to harvest fish for food and there have been no reports bad outcomes for humans.*

Rotenone is a plant-based compound that comes from specific plants in the bean family found in South America, Asia and Africa. Peoples in the countries where these plants naturally occur still use them to harvest fish for food. Harvesting fish for food is not an approved use of rotenone in the US according the product label. The only approved use for rotenone today if as a piscicide for fisheries management and killed fish are not to be consumed by people. It was also historically used as an insecticide for home and garden applications as well as on livestock but other substances have proven more effective and rotenone is no longer used for these purposes.

FWP will be neutralizing the treated water at the fish barrier site with potassium permanganate. This substance rapidly breaks down rotenone and prevents a fish kill from extending downstream beyond the target area.

Comment Category 5A. Public process.

Comment 22a. *Opposition to this project is primarily from local landowners. The project is on public property and all should have a say in how the property and its resources are managed.*

FWP takes all comments into consideration regardless of where those comment reside. FWP has received comments for and against the project from local landowners. FWP recognizes that local landowners have a larger stake in the project because they may potentially be the most affected. However, all comments have been considered equally during the decision process.

Comment 23a. *FWP has provided ample chances for public comment. FWP has for the last 5 years given public presentations at MDOT, FWP, Big Hole Watershed and George Grant Trout Unlimited meetings. FWP has mailed, emailed been in the newspaper and on TV regarding the French Creek project. The public has had ample chance to be informed and comment on the project. FWP has heard public comments. Detractors of the French Creek project are not interested in the facts and only FWP doing the project would convince them.*

FWP has for the past 5 years given multiple presentation to local groups about the French Creek project had have attempted to be as transparent as possible. FWP followed all legal responsibilities as far as noticing the project to the public goes. FWP officials met personally with most landowners in the drainage to discuss the project. That being said, FWP also recognizes that public involvement could have been improved (see Comment 24b). FWP has reopened the native fish restoration project of the original EA for public comment for 30 days and extended the comment period and additional 30 days to allow comment. Two public meetings were held and multiple newspaper and newsletters featuring the French Creek project have been produced. FWP believes the public has had ample opportunity to become informed about the project and comment.

Comment 24a. *FWP has been responsive to comments made in August public meeting for safety of the structure and safety of rotenone. FWP has done the proper studies regarding the fish barrier and rotenone and they are safe for people and the ecosystem*

FWP agrees with this comment. Significant money was expended to evaluate the potential flooding risk to property owners downstream of the fish barrier structure. An independent engineering firm was contracted to study to flooding risk and concluded the risks were minimal if the homes were built according to floodplain regulations. FWP brought one of the leading national experts on rotenone to the public meeting held in April in Butte to answer questions about rotenone.

Comment 25a. *FWP staff has been profession at meetings and patient during acrimonious and disrespectful discourse by those opposed to the project.*

The French Creek project and its review by the public has been at times a heated topic. FWP expresses gratitude for all who participate in the public process and applauds those who do so in a respectful and thoughtful manner.

Comment Category 6A. French Creek is an appropriate place for native fish restoration

Comment 26a. *The Mt Haggin area has been repeatedly hammered by the private sector historically; uncontrolled mining, hack and slash timer removal, unsustainable livestock grazing, environmental impacts from all of these. When all of those were done with eth various disasters they were inflicting, they kindly turned the wasteland over to the public…for a small fee. Through the deep dedication and hard work of many committed people with long range foresight—along with tremendous expenditure from the public coffers, the area has become rehabilitated, and continues to improve as a stellar, publicly accessible wild area with abundant recreation opportunities. Now, other folds with a sincere desire to create something of multiple values for all of us well into future generations are working to establish a naïve fishery, with great public access, to benefit people both local and worldwide. There is real economic worth in such a resource in and of itself, more so when the associated stress removal on local agriculture and other positive impacts are considered. People will be drawn here from various concrete jungles to enjoy such an attraction. The local family can get off shift at the local salt mine and head over the hill for a battery recharge and a unique experience of a grayling that nobody else in the contiguous 48 can have. The worth of this project is not being adequately weighed against the inflated concerns of the negatives of doing the work in my view. I cannot put a value on the personal pride I have when somebody from afar mentions, "Hey, you folks have those grayling"… or other things they can only reflect sadly upon; and I can say, "Yes we have."*

FWP concurs with this comment.

Comment 27a. *Native fish is capstone of multiple restoration efforts in the drainage. Restoration of westslope cutthroat trout and Arctic grayling to French Creek is last piece of the restoration puzzle in the drainage.*

FWP concurs. The original EA for French Creek Watershed Restoration listed the restoration of native fish species in the drainage as an integral component of overall watershed restoration.

Comment 28a. *French Creek is the only place in Big Hole where restoration project like this could be done without affecting ranching.*

This statement is correct. There are no other locations where a fish barrier exists or could be constructed that would isolate more miles of stream and not affect a private ranch in the Big Hole valley.

Comment 29a. *Purpose of purchase of MT Haggin was to let native wildlife flourish. FWP should follow the intent of the purchase of the property and restore native fish.*

FWP concurs with this comment.

Comment 30a. *French Creek is completely accessible to the public.*

French Creek is completely open to year-round public access. There are small portions of the drainage that are private property, but the vast majority is in public ownership and open.

Comment 31a. *The large scale of French Creek will give a much greater return on investment than the many smaller projects done to date.*

FWP concurs with this comment. The cost of the fish barrier and native fish restoration are not insignificant (see Comment 28b). However, given the amount of habitat that will be secure upstream of the fish barrier for native species, the cost per mile is much less than other native fish restoration projects. Further, the large size of the drainage will build in resiliency to the fish population and allow for multiple fish life histories to be expressed where fish can migrate from French Creek into tributaries to spawn. Smaller scale restoration efforts do not allow for these important considerations to be met.

Comment Category 7A. Beneficiaries of native fish restoration

Comment 32a. *The French Creek native fish restoration project will benefit all Montanan's.* I have b*een recreating in French Creek 20 years, this project will benefit everyone who comes to the Big Hole to pursue or observe native wildlife.*

FWP concurs. Native fish restoration benefits all Montana's. It conserves our native fish and prevents its extirpation. It reduces the potential of the species being listed as threatened or endangered. It provides a unique angling experience not found anywhere else in the lower 48 states. It restores the stream species composition that was present before area was settled. Many locals do not have this opportunity because their native species have been lost entirely.

Comment 33a. *Property values near the French Creek project should increase. Having property near the 2nd largest native fish project in the state should lead to increased value.*

FWP is not aware of any studies showing that property values have either increased or decreased as a result of native fish restoration. However, most restoration projects occur on public property so the chances to evaluate the impacts of these projects on land values are limited.

Comment Category 8A. General Comments.

Comment 34a. *The fish barrier engineering is sound and will be safe.*

FWP concurs.

Comment 35a. *FWP should stock other native species including mountain whitefish, sculpin invertebrates and crayfish. American Fisheries Society requests that FWP restore other native species to drainage.*

FWP will restore all native species to French Creek (See Comment 19b)

Summary of Comments Opposing the French Creek Native Fish Restoration Project:

Comment Category 1B: Rotenone

Comment 1b. *Rotenone is not natural. What is the track record of rotenone?*

Taken from page 24 and page 77 in the EA: "Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family such as the jewel vine (*Derris* spp.) and lacepod (*Lonchocarpus* spp.) that are found in Australia, southern Asia, and South America. Rotenone has been used by native people for centuries to capture fish for food in areas where these plants are naturally found… In their description of how South American Indians prepare and apply *Timbó*, a rotenone parent plant, Teixeira, et al. (1984) reported that the Indians extensively handled the plants during a mastication process, and then swam in lagoons to distribute the plant pulp. No harmful effects were reported." Leaves or other parts from these plants are pulped and used today by people in the countries where the plant naturally occurs to harvest fish for food. Rotenone has been used in fisheries management in North America since the 1930s. Rotenone has been applied in Montana for fisheries management since 1948. There have been no studies or incidences in Montana or any other state where rotenone was applied for fisheries management purposes and any impacts to human health or other non-target terrestrial organisms were reported.

Comment 2b. *So many other chemicals were said to be safe and later proved unsafe. What makes rotenone any different than these? Just because rotenone is a natural substance does not mean it is safe (for example: opium, lead, arsenic, etc.).*

Rotenone has been used for nearly 90 years in a variety of fisheries management applications. Significant testing has been done on its potential effects on the human and natural environment over this time span. The studies involving rotenone are summarized in the EA. Rotenone has been thoroughly vetted through the US Environmental Protection Agency which has approved its use for fisheries management. An exhaustive review of the potential impacts of rotenone was conducted by the state of Arizona and they concluded that as long as label recommendations were adhered to the risk to human health was negligible. From page 77 of the EA: "Extensive research has demonstrated that rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981; BRL 1982) or cancer (Marking 1988). Rotenone was found to have no direct role in fetal development of rats that were fed high concentrations of rotenone. Spencer and Sing (1982) reported that rats that were fed diets laced with 10-1,000 ppm rotenone over a 10-day period did not suffer any reproductive dysfunction. Typical concentrations of actual rotenone used in fishery management range from 0.025 to 0.50 ppb and are far below that administered during most toxicology studies."

It is true that just because a substance is of natural origin does not necessarily mean that it is safe. When rotenone is mentioned as being a natural plant-based compound it is meant to imply that the substance is not persistent in the environment and readily breaks down through natural processes; not that it is inherently innocuous. Rotenone is very lethal to fish which is why it is registered as restricted use pesticide; however, the risk to humans and other plants and animals is negligible when used according to the product label. Because rotenone is a natural compound extracted from plants, it does not persist in the environment and is readily broken down. This rapid breakdown lessens the impacts to non-target organisms. Other natural elements such as lead and arsenic do not degrade in the environment and can persist for centuries because they are in their elemental forms. This is not the case for rotenone which readily breaks down due to exposure to sunlight, dilution from freshwater sources, turbulence, exposure to organic matter and differing water chemistry.

Comment 3b. *Does rotenone cause Parkinson's Disease?*

Taken from page 77-78 of the EA: "One study, in which rats were injected with rotenone for a period of weeks, reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). However, the relevance of the results to the use of rotenone as a piscicide have been challenged based upon the following dissimilarities between the experimental methodology used and fisheries related applications: (1) the continuous intravenous injection method used to treat the rats leads to "continuously high levels of the compound in the blood," unlike field applications where 1) the oral route is the most likely method of exposure, 2) a much lower dose is used and 3) potential exposure to rotenone is limited to usually only a matter of days because of the rapid breakdown of the rotenone following application. Further, dimethyl sulfoxide (DMSO) was used to enhance tissue penetration in the laboratory experiment (normal routes of exposure actually slow introduction of chemicals into the bloodstream), no such chemicals enhancing tissue penetration are present in the rotenone formulation proposed for use in this treatment. Similar studies (Marking 1988) have found no Parkinson-like results.

"A recent study linked the use of rotenone and paraquat with the development of Parkinson's disease (PD) in humans later in life (Tanner et al. 2011). The after-the-fact study included mostly farmers from 2 states within the United States who presumably used rotenone for terrestrial application to crops and/or livestock. Rotenone is no longer approved for agricultural uses and is only approved for aquatic application as a piscicide. The results of epidemiological studies of pesticide exposure, such as this one have been highly variable (Guenther et al. 2011). Studies have found no correlations between pesticide exposure and PD (e.g., Jiménez-Jiménez 1992; Hertzman 1994; Engel et al. 2001; Firestone et al. 2010), some have found correlations between pesticide exposure and PD (e.g., Hubble et al. 1993; Lai et al. 2002; Tanner et al. 2011) and some have found it difficult determine which pesticide or pesticide class is implicated if associations with PD occur (e.g., Engel et al. 2001; Tanner et al. 2009). Recently, epidemiological studies linking pesticide exposure to PD have been criticized due to the high variation among study results, generic categorization of pesticide exposure scenarios, questionnaire subjectivity, and the difficulty in evaluating the causal factors in the complex disease of PD, which may have multiple causal factors (age, genetics, environment; Raffaele et al. 2011). A specific concern is the inability to assess the degree of exposure to certain chemicals, including rotenone, particularly the concentration of the chemical, frequency of use, application (e.g., agricultural, insect removal from pets), and exposure routes (Raffaele et al. 2011). No information is given in the Tanner et al. (2011) study about the formulation of rotenone used (powder or liquid) or the frequency or dose farmers were exposed to during their careers. There is also no information given about the personal protective equipment used or any information about other pesticides farmers were exposed to during the period of the study. It is also unclear in the Tanner et al. (2011) study the frequency and the dose individuals were exposed to during the time period of use. Without information on how much rotenone individuals were exposed to and for how long, it is difficult to evaluate the potential risk to humans of developing Parkinson's disease from aquatic applications of rotenone products.

"The state of Arizona conducted an exhaustive review to the risks to human health of rotenone use as a piscicide (Guenther et al. 2011). They concluded: "To date, there are no published studies that conclusively link exposure to rotenone and the development of clinically diagnosed PD. Some correlation studies have found a higher incidence of PD with exposure to pesticides among other factors, and some have not. It is very important to note that in case-control correlation studies, causal relationships cannot be assumed and some associations identified in odds-ratio analyses may be chance associations. Only one study (Tanner et al. 2011) found an association between rotenone and paraquat use and PD in agricultural workers, primarily farmers. However, there are substantial differences between the methods of application, formulation, and doses of rotenone used in agriculture and residential settings compared with aquatic use as a piscicide, and the agricultural workers interviewed were also exposed to many other pesticides during their careers. Through the EPA reregistration process of rotenone, occupational exposure risk is minimized by: new requirements that state handlers may only apply rotenone at less than the maximum treatment concentrations (200 ppb), the development of engineering controls to some of the rotenone dispensing equipment and requiring handlers to wear specific PPE.

"It is clear that to reduce or eliminate the risk to human health, including any potential risk of developing Parkinson's disease, public exposure to rotenone treated water must be eliminated to the extent possible. To reduce the potential for exposure of the public during the proposed use of rotenone to restore WCT, areas treated with rotenone would be closed to public access during the treatment. Signs would be placed at access points informing the public of the closure and the presence of rotenone treated waters. Personnel would be onsite to inform the public and escort them from the treatment area should they enter. Rotenone treated waters would be contained to the proposed treatment areas by adding potassium permanganate to the stream at the downstream end of the treatment reach (fish barrier). Potassium permanganate would neutralize any remaining rotenone before leaving the project area. The efficacy of the neutralization would be monitored using fish (the most sensitive species to the chemical) and a hand held chlorine meter. Therefore, the potential for public exposure to rotenone treated waters is very minimal. The potential for exposure would be greatest for those government workers applying the chemical. To reduce their exposure, all CFT Legumine label mandates for personal protective equipment would be adhered to (see Comment 8a)."

Comment 4b. *Will rotenone affect adjacent landowners? Will rotenone contaminate the groundwater and the drinking water of wells within or adjacent to the project area?*

Rotenone has never been detected in groundwater wells. The following is an excerpt from page 45 of the EA: "Rotenone binds readily to sediments and is broken down by soil and in water (Skaar 2001; Engstrom-Heg 1971, 1976; Ware 2002). Rotenone moves only one inch in most soil types; the only exception would be sandy soils where movement is about three inches (Hisata 2002). In California, studies where wells were placed in aquifers adjacent to and downstream of rotenone applications have never detected rotenone, rotenolone, or any of the other organic compounds in the formulated products (CDFG 1994). Case studies in Montana have concluded that rotenone movement through groundwater does not occur. For example, at Tetrault Lake, Montana, neither rotenone nor inert ingredients were detected in a nearby domestic well, which was sampled two and four weeks after applying 90 ppb rotenone to the lake. This well was chosen because it was down gradient from the lake and also drew water from the same aquifer that fed and drained the lake. In 1998, a Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well, located 65 feet from the pond, was analyzed and no evidence of rotenone was detected. In 2001, another Kalispell-area pond was treated with Prenfish 5% rotenone. Water from a well located 200 feet from that pond was tested four times over a 21-day period and showed no sign of contamination. In 2005, FWP treated a small pond near Thompson Falls with Prenfish to remove pumpkinseeds and bass. A well located 30 yards from the pond was tested and neither Prenfish nor inert ingredients were found in the well. In Soda Butte Creek near Cooke City, Montana, a well at a Forest Service campground located 50 feet from a treated stream was tested immediately following and 10 months after treatment with Prenfish and no traces of rotenone were found (Olsen 2006). Because rotenone is known to bind readily with stream and lake substrates and has never been detected in groundwater wells previously we do not anticipate any contamination of ground water as a result of this project."

There is no indication that French Creek in the vicinity of private property is a gaining or losing reach of stream, meaning that surface waters are readily interacting with groundwater through increasing or decreasing surface flows. If the reach downstream of the fish barrier were a losing reach of stream and substantial surface flows were entering the ground FWP would anticipate that flows downstream of the private property would be less than upstream and there is no evidence to suggest this occurring. It appears that a semi static state exists on French Creek from the FWP property boundary through private property to the confluence of Deep Creek where flows neither increase or decrease. This static state also reduces the likelihood that any rotenone treated waters would enter the groundwater.

There are no groundwater wells within the immediate project area. There are groundwater wells near streams that will be treated with rotenone in the upper watershed but these wells are considered far enough from the streams to be considered very unlikely to have any hydrologic connection with the stream. There are 2 groundwater wells on property located downstream of the project area. Rotenone will be detoxified at the fish barrier site on FWP property using potassium permanganate. Therefore, no surface waters containing rotenone are anticipated to enter private property

FWP has offered to pay for well testing on private property.

Comment 5b. *Will the proposed project affect Buttes water supply? Will the propose project impact waters downstream like Deep Creek and the Big Hole River?*

Treated waters in French Creek would be neutralized at the fish barrier with potassium permanganate and no rotenone treated waters would leave the project area. This neutralization process breaks down the rotenone to non-toxic components and no fish would be killed downstream of the immediate project area. Rotenone naturally degrades very rapidly in the environment and the chemical is not anticipated to persist longer than 48 hours in the stream. FWP has a very comprehensive neutralization policy that further reduces the risk of treated waters going beyond the project area (See also Comment 6 and 7). This policy includes redundancy in application equipment in case of equipment failure and a conservative initiation and cessation potassium permanganate application to ensure that all rotenone treated waters have been fully neutralized. Since the implementation of this policy in 2011, there have been no incidence of rotenone traveling beyond the targeted area.

In the unlikely event that an incident was to occur on French Creek where treated waters went beyond the fish barrier, dilution alone would eliminate the risk of treated waters reaching the Butte water intake. Assume French Creek is flowing 10 cfs. It flows into Deep Creek which is slightly larger (15 cfs) than French Creek. Deep Creek flows into the Big Hole River which is a minimum of 10 times the size of Deep Creek (median flow is 200 cfs). Even in a low flow year such as in 2017 the Big Hole River at Dickie Bridge was 134 cfs, nearly 10 times the flow of Deep Creek. The target application rate of rotenone into French Creek is 1 part rotenone formulation to 1 million parts of water (ppm). Therefore, if no neutralization were to take place at the fish barrier and rotenone treated waters at the maximum application rate of 1 part per million (ppm) concentration traveled to Deep Creek it would be diluted to less than 0.5 ppm. At the confluence of the Big Hole River it would be diluted to a maximum of 0.05 ppm. The minimum lethal concentration of rotenone for trout is between 0.05 and 1.0 ppm. Therefore, through dilution alone the chemical would be below fish killing concentrations once it reached the Big Hole River and fish are the most sensitive organism to rotenone. The Butte water intake is located more than 22 miles downstream of the confluence with Deep Creek. There would be no risk to the Butte water supply from the proposed treatment.

Comment 6b. *How will the public be protected who recreate in the French Creek area during the treatment?*

The CFT Label states: Do not allow recreational access (e.g., wading, swimming, boating, and fishing) within the treatment area while rotenone is being applied. From page 25 of EA: "To keep the public from being exposed to rotenone treated waters, specific public accesses would be closed during treatment. These closed areas may include secondary primitive roads that access a single drainage. These areas would only be closed when rotenone is being actively applied. Signs would be placed at stream crossings and other access points (i.e., trailheads) during the treatment including signage at stream crossings informing the public of the presence of treated waters and to keep out." Our target application rate of rotenone is 1 ppm. As per the label, the treatment area will be closed while the chemical is being applied. Roads will be closed to public access during treatments and all stream crossings will be signed as per label requirements. Highway 569 will not be closed during the treatment. However, each stream crossing will be heavily signed and marked to keep people from entering the treatment area while the chemical is being applied. Stream treatments will be scheduled as best as possible during the week when recreational traffic is less rather than the weekend to reduce the impacts to the public during the treatment. Once the application is completed in a given stream, access will be opened and there would be no impact to recreationists who use the area other than a temporary lack of fish in the streams.

Comment 7b. *If an accident were to occur and rotenone goes beyond the fish barrier, what is the mitigation plan to ensure limited impact to human health, downstream property and water resources. Reminder of Cherry Creek on the Madison and that rotenone went beyond the fish barrier there. How will FWP ensure that this will not happen again?*

The likelihood on an incident occurring and rotenone traveling beyond the treatment area is minimal. Following the product label during application and neutralization and FWP's Detoxification Policy will minimize the risk of rotenone traveling beyond the fish barrier. Neutralization is initiated long before any rotenone arrives at the fish barrier and is not stopped until four hours after all the treated waters have cleared the fish barrier. Neutralization is not stopped until fish placed in the stream upstream of the neutralization station do not show any signs of exposure to rotenone for 4 hours. A completely independent backup neutralization system is in place for all rotenone projects if the primary application equipment malfunctions. Neutralization, once initiated, is conducted 24 hours a day until the criteria for stopping (as discussed above) have been met. The neutralization station is always manned by a Certified Applicator (see comment 9) who is experienced in detoxification. The efficacy of the neutralization is monitored in 2 ways. First, sentinel fish are placed both upstream and downstream of the neutralization area. Fish are the most sensitive organism to rotenone. Neutralization is also monitored through the use of a (chlorine) meter which directly measures the concentration of potassium permanganate in the water. The target concentration of potassium permanganate after 30 minutes of contact with rotenone treated waters is 0.5-1.0 ppm. This ensures enough residual potassium permanganate after 30 minutes of contact to have fully neutralized the rotenone. Potassium permanganate will be regularly monitored during neutralization to ensure all rotenone treated water is deactivated and fish downstream of the treatment area are not impacted.

In the unlikely event that rotenone treated waters go beyond the fish barrier, landowners downstream would be immediately notified. There are no risks to human health from exposure to rotenone at fish killing concentrations proposed for this project. There has been no documentation of rotenone having any impacts on groundwater even when the treatment area is within the area of groundwater wells. As a precaution FWP would offer bottled water for well owners to use until laboratory testing of wells is completed. If access is granted by the landowners, any killed fish would be collected and disposed of off-site. There are no irrigation diversions on French Creek. The coordination of the shutoff of irrigation diversions on Deep Creek would be done with the landowner so that they are closed immediately. As noted in Comment 5b, there would be no impacts to the Big Hole River because dilution will have reduced rotenone to below fish killing concentrations.

Comment 8b. *Rotenone is not safe to use in flowing waters. It can lay dormant then be released.*

Rotenone is safe to use in flowing waters. When used according to the product label, it is safe to use in both flowing and standing waters. In flowing waters rotenone must be neutralized as it leaves the project area as per the label requirements. FWP is not aware of any incident where rotenone has laid dormant and then been released at a later time. If the commenter has evidence of this, we would request that it be provided to FWP.

Comment 9b. *Does FWP have a certification or qualification program for employees or contractors applying rotenone to Montana waterways? How will FWP application equipment and personnel be monitored so that rotenone is being applied according to label requirements?*

All piscicide projects in Montana must be conducted by a Certified Applicator. Certification is done through the MT Department of Agriculture and consists of learning course material and passing an examination to become a certified applicator. Licenses are renewed on an annual basis and recertification credits are required. In addition to these certifications through the Department of Agriculture, FWP oversees a state-wide Piscicide Committee that aids in the development and oversight of piscicide projects. This committee has developed its own more stringent Piscicide Policy, which includes the neutralization policy mentioned in Comment 7) and Certified Applicator development program. Within the Certified Applicator development program there are 4 tiers. To advance through the tiers an individual must complete additional education and assist in multiple projects. These additional certifications include attendance at the "Planning and Executing Successful Rotenone and Antimycin Projects" course offered by the American Fisheries Society. This course provides hands on experience applying piscicides from some of the most experienced experts in the country. The individual must also assist in and conducted multiple prior treatment projects before being certified to lead their own project. This process allows mentorship for Certified Applicators to help them learn the proper procedures for safe handling of piscicides and successful execution of piscicide projects. All projects, independent of the level of Certified Applicator are overseen by an on-the-ground Independent Applicator who reviews all aspects of the project and is available to provide technical expertise during project implementation.

All personnel who assist on a piscicide project must be registered pesticide operators with the Department of Agriculture. They then apply rotenone under the Certified Applicator's License. Safety and application training is provided to these individuals through the Certified Applicator. All equipment used to apply rotenone is calibrated annually prior to use to ensure it applies rotenone at the target rate specified on the product label. The amount of rotenone applied to the stream is determined once the stream discharge is calculated. Using label instructions, the Certified Applicator measures the correct amount of rotenone into the drip container. The drip container is then given to the Operator and taken to the specified location on the stream. The drip container is filled to the top with stream water and the drip apparatus is attached. The container drains into the stream over a 4-hour period. The drip apparatus has a small predrilled hole that is non-adjustable making it impossible for the container to deliver rotenone to the stream faster than 1 ppm. The container is continually monitored for clogging. Communication through 2-way radios is also present throughout the project area so that if there are questions or problems with field equipment assistance can be provided by the Certified Applicator.

Comment 10b. *What are the impacts of rotenone to non-target organisms including but not limited to birds, wildlife that may drink water or eat fish killed by rotenone, pets that may be near French Creek? What about the impact to other aquatic organism such as invertebrates and amphibians? What evidence is there that the organisms like aquatic insects recover after treatment with rotenone (photo evidence)? What has happened to the stoneflies on the Big Hole (FWP has assumed that this commenter is implying that previous applications of rotenone to tributary streams in the Big Hole has caused a decline in salmonflies).*

The following excerpt has been taken from pages 52-56 of the EA:

"Aquatic Invertebrates:

"Numerous studies indicate that rotenone has temporary effects on aquatic invertebrates. The most noted impacts are temporary and often substantial reduction in invertebrate abundance and diversity. In a study of the impacts of a rotenone treatment in Soda Butte Creek in south-central Montana, aquatic invertebrates of nearly all taxa declined dramatically immediately post rotenone treatment; however, only one year later nearly all taxa were fully recovered and at greater abundance than pre-treatment (Olsen and Frazer 2006). One study reported that no long-term significant reduction in aquatic invertebrates was observed due to the effects of rotenone, which was applied at levels twice as high as the levels proposed for this project (Houf and Campbell 1977). Some have reported delayed recovery of taxa richness (number of taxa present) following rotenone treatments, but many of these treatments were at higher concentrations than proposed in this treatment (Mangum and Madrigal 1999). Finlayson et al. (2010) summarized high concentrations of rotenone (>100 ppb) and treatments exceeding 8 hours, typically resulted in severe impacts to invertebrate richness and abundance. Conversely, lower rotenone concentrations (<50 ppb) and treatments less than 8 hours, resulted in less impact to invertebrate assemblages. Chandler and Marking (1982) found that bivalves and snails were between 50 and 150 times more tolerant than fish to Noxfish (5% rotenone formulation). In all cases, the reduction of aquatic invertebrates was temporary, and most treatments used a higher concentration of rotenone than proposed for these projects (Schnick 1974). In a study on the relative tolerance of different aquatic invertebrates to rotenone, Engstrom-Heg et al. (1978) reported that the long-term impacts of rotenone are mitigated because those insects that were most sensitive to rotenone also tended to have the highest rate of recolonization. Temporary changes in aquatic invertebrate community structure due to a rotenone treatment could be similar to what is observed after natural (e.g., fire) and anthropogenic (livestock grazing) disturbances (Wohl and Carline 1996; Mihuc and Minshall. 2005; Minshall 2003), though the physical impacts and resulting modifications of invertebrate habitat and assemblages after these types of disturbances can last for a much longer period than a piscicide treatment.

“Because of their short life cycles (Anderson and Wallace 1984), good dispersal ability (Pennack 1989), and generally high reproductive potential (Anderson and Wallace 1984), aquatic invertebrates are capable of rapid recovery from disturbance (Boulton et al. 1992; Matthaei et al. 1996). Headwater reaches and tributaries to the proposed native fish restoration streams that do not hold fish would not be treated with rotenone and would provide a source of aquatic invertebrate colonists that could drift downstream. In addition, recolonization would include aerially dispersing invertebrates from downstream areas.

“The possibility of eliminating a rare or endangered species of aquatic invertebrate in the proposed streams by treating with rotenone is very unlikely. In SW Montana, as part of separate MEPA processes, aquatic invertebrates have been routinely collected prior to WCT restoration projects in mountain streams (e.g., Eureka, Little Tepee, Little Tizer, Elkhorn, Crazy, Whitehorse, Soda Butte creeks). In all cases, these collections have shown aquatic invertebrate assemblages typical of headwater streams in southwestern Montana, and in no cases have threatened or endangered species been discovered. Aquatic invertebrates will be collected from French Creek prior to treatment with rotenone and one year and five years post treatment to monitor the recovery of aquatic invertebrate populations in both rotenone treated reaches and restored reaches of stream. FWP expects that the proposed streams contain the same type of aquatic invertebrate assemblages found in other nearby streams and the possibility of eliminating a rare or endangered species is minimal. If a sensitive species is present in French Creek, FWP would work with Montana Natural Heritage Program biologists to develop a plan to mitigate the potential impacts on that species.

“Birds and Mammals:

“Mammals are generally not affected by rotenone at fish killing concentrations because they neutralize rotenone by enzymatic action in their stomach and intestines (AFS 2002). Studies of risk for terrestrial animals found that a 22 pound dog would have to drink 7,915 gallons of treated water within 24 hours, or eat 660,000 pounds of rotenone-killed fish, to receive a lethal dose (CDFG 1994). The State of Washington reported that a half pound mammal would need to consume 12.5 mg of pure rotenone to receive a lethal dose (Bradbury 1986). Considering the only conceivable way an animal can consume rotenone under field conditions is by drinking lake or stream water or consuming dead fish, a half pound animal would need to drink 16 gallons of water treated at 1 ppm to receive a lethal dose of rotenone.

“The EPA (2007) made the following conclusion for small mammals and large mammals;

“When estimating daily food intake, an intermediate-sized 350 g mammal will consume about 18.8 g of food. Using data previously cited from the common carp with a body weight of 88 grams, a small mammal would only consume 21% (18.8/88) of the total carp body mass. According to the data for common carp, total body residues of rotenone in carp amounted to 1.08 µg/g. A 350-g mammal consuming 18.8 grams represents an equivalent dose of 20.3 µg of rotenone; this value is well below the median lethal dose of rotenone (13,800 µg) for similarly sized mammals. When assessing a large mammal, 1000 g is considered to be a default body weight. A 1,000 g mammal will consume about 34 g of food. If the animal fed exclusively on carp killed by rotenone, the equivalent dose would be 34 g *1.08 µg/g or 37 µg of rotenone. This value is below the estimated median lethal equivalent concentration adjusted for body weight (30,400 µg). Although fish are often collected and buried to the extent possible following a rotenone treatment, even if fish were available for consumption by mammals scavenging along the shoreline for dead or dying fish, it is unlikely that piscivorous mammals will consume enough fish to result in observable acute toxicity.

"Similar results determined that birds required levels of rotenone at least 1,000 to 10,000-times greater than is required for lethality in fish (Skaar 2001). Cutkomp (1943) reported that chickens, pheasants and members of lower orders of *Galliformes* were quite resistant to rotenone, and four day old chicks were more resistant than adults. Ware (2002) reports that swine are uniquely sensitive to rotenone and it is slightly toxic to wildfowl, but to kill Japanese quail required 4,500 to 7,000 times more than is used to kill fish.

"The EPA (2007) made the following conclusion for birds;

"Since rotenone is applied directly to water, there is little likelihood that terrestrial forage items for birds will contain rotenone residues from this use. While it is possible that some piscivorous birds may feed opportunistically on dead or dying fish located on the surface of treated waters, protocols for piscicidal use typically recommend that dead fish be collected and buried, rendering the fish less available for consumption (see Section IV). In addition, many of the dead fish will sink and not be available for consumption by birds. However, whole body residues in fish killed with rotenone ranged from 0.22 µg/g in yellow perch (Perca flavescens) to 1.08 µg/g in common carp (Cyprinus carpio; Jarvinen and Ankley 1998). For a 68 g yellow perch and an 88 g carp, this represents totals of 15 µg and 95 µg rotenone per fish, respectively. Based on the avian subacute dietary LC50 of 4,110 mg/kg, a 1,000-g bird would have to consume 274,000 perch or 43,000 small carp. Thus, it is unlikely that piscivorous birds will consume enough fish to result in a lethal dose."

Additional studies have shown that the impacts to aquatic invertebrates and amphibians are short-term and minimal. A study of response of benthic invertebrates in streams in Montana and New Mexico used a concentration and duration of CFT Legumine like the one that is proposed in this project. In Cherry Creek and Specimen Creek, both in Montana, rotenone resulted in minimal effects on macroinvertebrates immediately after. Rotenone had a greater effect on benthos in streams in New Mexico. Regardless of the initial response, invertebrate communities recovered in all streams within a year (Skorupski 2011). In Yellowstone Park rotenone caused nearly 100% mortality in gill-breathing, amphibian tadpoles within 24 hours, but did not affect non-gill breathing metamorphs, juveniles, or adults. In the year(s) following, tadpole repopulation occurred at all water bodies treated with CFT Legumine and population levels were similar to or higher than, pre-treatment levels (Billman et al. 2012). Olsen (2017) found that a concentration of 1 ppm rotenone in the West Fork of Mudd Creek produced 100% mortality of tailed frog tadpoles, but concentrations of 0.75, 0.5 and 0.25 mortality averaged only 33%. To mitigate for the potential impacts to larval stages of amphibians, applications in French Creek would be performed later in the summer (late July to September) when the larval amphibians are not present. Fried et al. (2018) reported no long-term impacts on amphibian populations in 10 mountain lakes treated with rotenone in northwest Montana due to the timing of the treatment, the low concentration of rotenone used and immigration to the sites from adjacent areas.

For a review of salmonfly (*Pteronarcys californica)* data available for the state of Montana and the Big Hole River see Stagliano (2011). One recent study over a 50-year period showed no significant declines in salmonfly density in 2 sites in the Big Hole River at Melrose and at Notch Bottom near Glen (Stagliano and Peterson 2016). This study concluded there was significant evidence that the overall macroinvertebrate communities at the two Big Hole River sites sampled have increased in diversity and sensitive taxa over the last 50 years. Salmonfly abundance has been shown to be cyclical. It should be noted that the concerns raised about salmonfly abundance in the Big Hole River existed well prior to 2011 when the first rotenone treatment was performed in the drainage. No salmonflies were documented in any of the streams previously treated with rotenone in the Big Hole watershed. No rotenone from these treatments went beyond the fish barriers where neutralization took place and entered the Big Hole River.

FWP does not maintain an archive of invertebrates and amphibian photos from prior rotenone treatments. FWP does maintain the databases with the counts of specific invertebrates and amphibian taxa which are published in scientific journals, white papers and reports. FWP would be happy to take people on tours of previous projects to show the aquatic life in the stream post treatment and that amphibians are present and abundant.

Comment 11b. *Will rotenone be applied to any streams not on FWP property?*

Yes, small parcels of land owned and managed by the USDI Bureau of Land Management are present on Moose Creek and the US Forest Service owns and manages the headwaters of Moose Creek and Lincoln Gulch (Panama Creek). The Department of Natural Resources and Conservation owns and manages a ½ section of California Creek upstream of the confluence of French Gulch. There is 1 small parcel of private property with water on an unnamed tributary to Oregon Creek and a similar parcel on an unnamed tributary to California Creek. There is also a single parcel covering over 2 miles of California Creek that is on private property.

Comment Category 2B: Why is FWP doing these projects?

Comment 12b. *Why is FWP managing for native fish and removing wild, naturally reproducing non-native trout? Is FWP actively managing against brook trout? What is wrong with brook trout fisheries that FWP wants to get rid of them? Why would FWP want to remove non-native fish from 400 miles of stream in the Big Hole? Enough of these projects have been done. Use of piscicides is too drastic of a measure. We don't need any more of these projects. What are the alternatives to piscicide?*

FWP is required by law (§87-1-201(9)(a) Montana Code Annotated [MCA]) to implement programs that manage sensitive fish species in a manner that assists in the maintenance or recovery of those species, and that prevents the need to list the species under § 87-5-107 MCA or the federal

Endangered Species Act. Section 87-1-201(9)(a), M.C.A. Westslope cutthroat trout have been petition for listing under the Endangered Species Act. In the Missouri River drainage, they are present in less than 6% of their historic range. Arctic grayling have also been petition to be listed under the Endangered Species Act and are currently being litigated to be added to the list. Multiple studies have shown that the most effective means to restore westslope cutthroat trout in suitable habitat, is to remove non-native fish. Once non-native fish are removed, westslope cutthroat trout populations thrive. The interaction between non-native fish and Arctic grayling is less understood, but projects such as French Creek could shed light on this relationship.

There are 2,100 miles of stream in the Big Hole drainage that were historically occupied by native species including Arctic grayling and westslope cutthroat trout. Overfishing and habitat degradation drove stocks of native fish down. Brook, rainbow and brown trout were introduced to southwest Montana around the turn of the 19th century to augment decimated native fish stocks. Significant stocking programs compensated for degraded habitat conditions and maintained fisheries in many of our rivers and streams through the early 1900's. As habitat conditions improved over the next century, stocking of rivers and streams ceased by the 1980's in favor of wild fish management, but there were few cutthroat or grayling left.

FWP is not actively managing against brook trout. Brook trout in the Big Hole River drainage are ubiquitous. Every stream without exception in the Big Hole drainage that has adequate water and habitat to support fish contains a self-sustaining population of brook trout. They are a fantastic fish and have been shown to thrive in a variety of habitats and are one of if not the best tasting trout. The Central Fishing District standard fishing regulations consist of a 20 fish brook trout limit. This limit has been set to encourage brook trout harvest to make better brook trout fisheries, not necessarily for native fish conservation. With few exceptions, brook trout tend to overpopulate resulting in stunted fish growth. The primary objective of the high harvest limits for brook trout is not to aid native fish recovery, but to produce a higher quality brook trout fishery, which is why it is a Central District-wide regulation. The long-term goal of native fish restoration is not to get rid of brook trout. The goal is to try and secure some habitat for native fish (20%) where they can exist without the threats that non-native fish present and manage the remaining vast majority for native fish (80% of habitat)

The goal of native fish restoration in the Missouri River drainage is to restore westslope cutthroat trout to 20% of their historically occupied habitat (FWP 2012) to ensure the long-term persistence of the species. Westslope cutthroat trout historically occupied approximately 2,100 miles of streams in the Big Hole drainage alone making the native fish restoration goal for the drainage 400 miles of stream. Conversely, this means that in the Big Hole 80% of the habitat or 1,700 miles of stream, will continue to be managed for non-native fish like brook, brown and rainbow trout. Only in a few select streams with suitable habitat and suitable locations for a fish barrier, such as French Creek, will native fish restoration projects be proposed. No active cutthroat restoration will be performed in the Big Hole River; however, FWP is already seeing cutthroat trout in the Big Hole River that are migrating downstream and colonizing the river and adding diversity to the river fishery from tributary restoration projects. The long-term goal of restoring 400 miles of stream in the Big Hole to cutthroat trout will take decades to accomplish. If French Creek is restored to native fish, nearly 100 miles of stream in the Big Hole watershed will have been restored to native fish.

The alternatives to using piscicide to perform native fish restoration were discussed on pages 37-39 of the EA. In summary, other techniques such as mechanical removal (i.e., nets and electrofishing) have not been effective on streams over 3-4 miles in length. Stocking has not been effective at creating new native fish population that persist and become self-sustaining. Changing fishing regulations has not proven effective at restoring native fish populations, particularly in small stream because fishing pressure is generally light, and harvest is limited.

Comment 13b. *Westslope cutthroat trout are unfit or a weak fish that cannot compete with introduced and more hardy brown and brook trout.*

While it is true that brown and brook trout have been successful at outcompeting native westslope cutthroat trout, it is not true that westslope cutthroat trout are less hardy than their non-native cousins. Brown and brook trout spawn in the fall and their eggs lay in stream gravels all winter and hatch out in early spring (April and May). Westslope cutthroat trout do not spawn until the middle to end of June and the fish do not emerge from the gravels until mid to late August. By that time brook trout have grown to the size where they are competitively superior and can prey upon the cutthroat. This early life stage is when brook trout gain the advantage over cutthroat. Once a cutthroat has survived its first year, it can complete just fine with brook trout. However, with year after year of unsuccessful reproduction due to predation and competition from brook trout, cutthroat trout fisheries quickly decline and eventually disappear entirely.

Data collected from cutthroat restoration projects where sufficient time has elapsed to allow multiple generations of fish have shown that westslope cutthroat trout equal or exceed the density of brook trout that were removed and grow larger than brook trout did previously (McVey Creek in the Big Hole and Cherry Creek in the Madison).

Comment 14b. *Westslope cutthroat trout are not native. Yellowstone cutthroat trout are the native trout.*

C.J.D. Brown in Fishes of Montana (1971) lists both westslope and Yellowstone cutthroat trout as existing in Montana but did not segregate their ranges. Robert Behnke in his 1992 publication "Native Trout of North America" clearly distinguishes between the native ranges of westslope cutthroat trout and Yellowstone cutthroat trout. The native range of the westslope cutthroat trout includes western Montana drainages and the Missouri River and the Yellowstone cutthroat trout native range includes the Yellowstone River drainage. His evidence for the distinction in range between the two subspecies comes from the geographic distribution remnant fish populations of and genetics. This geographic distribution has been accepted and recognized in fisheries management for more than 25 years and there is no evidence that FWP is aware of to refute it. More recent genetic and meristic evidence has all pointed to westslope cutthroat trout being native to the Missouri River basin.

In French Creek there are no Yellowstone cutthroat trout. There were 3 remnant populations of westslope cutthroat trout in the drainage, all isolated at the headwaters of the streams. Two of which, Sixmile and Moose Creek have been extirpated in the past 20 years by competition and predation from brook trout. One population remains in American Creek at the headwaters of the stream. A historic dam on the stream used for logging has prevented brook trout from colonizing the upper reaches of the stream and a small cutthroat population is present. No Yellowstone cutthroat trout or Yellowstone cutthroat trout genes have been detected in any fish sampled in French Creek.

Comment 15b. *Cutthroat trout were thought detrimental to grayling in Red Rock Creek.*

The cutthroat trout in Red Rock Creek and Red Rock Lake are a hybrid Yellowstone cutthroat trout introduced in the early 1900's. It was hypothesized that these hybrid fish could be having detrimental effect on the graying in Red Rock Lake. To test this hypothesis, the fishery was managed to actively reduce cutthroat abundance and monitor the effect on grayling numbers. Cutthroat trout numbers were reduced and synonymously grayling numbers also declined. The hypothesis was proven incorrect and active cutthroat suppression was ceased. It appears that factors other than cutthroat trout abundance affect grayling numbers in Red Rock Lake.

Comment 16b. *Hybrids occur in other species, why does hybridization matter for westslope cutthroat trout?*

Unlike hybrids between other species such as mule (hybrid between a donkey and a horse), hybrid cutthroat trout are not reproductively sterile. So, a cutthroat trout that mates with a rainbow trout to produce a hybrid will be then be able to mate with another cutthroat and/or rainbow. The genetics of those species are then permanently altered, and the effect can last for generations. Because a mule cannot reproduce the genetic impacts of hybridization is limited only to that individual and does not affect future generation. This is not the case for cutthroat trout hybrids. Therefore, maintaining a non-hybridized cutthroat trout in the presence of a hybridizing species is nearly impossible and once hybridization occurs there is no going back unless management actions are taken. In Montana, a cutthroat trout population that is at least 90% westslope cutthroat is considered a conservation population and is managed for the long-term conservation of the genetics of that population.

Comment Category 3B: Do these Projects Work?

Comment 17b. *What WCT restoration projects have been done and have they worked? What are the chances of success in French Creek? What about Cherry Creek in Melrose that is still on going?*

Below is a list of westslope cutthroat restoration projects done in the Missouri River drainage from 2008 to 2015 by sub-basin:

SUB BASIN	MILE HISTORICAL OCCUPIED BY WCT	MILES OCCUPIED IN 2008 (% OF HISTORIC)	NUMBER OF POPULATIONS	2008-2013 PROJECTS # STREAMS/# MILES

Beaverhead	828	69 (8.3%)		1 Stream/8 miles
Big Hole	2141	129 (6.0%)		11 Streams/57 miles
Boulder	574	31 (5.4%)		1 Stream/4 miles
Gallatin	1067	4 (0.4%)		3 Streams/ 19 miles
Jefferson	789	15 (1.9%)		--
Madison	1222	9 (0.7%)		3 Streams/103 miles
Red Rock	1665	106 (6.4%)		1 Stream/6.5 miles
Ruby	896	48 (5.4%)		1 Stream/15.5 miles
Upper Missouri	1859	55 (3.0%)		6 streams/13 miles*
TOTAL	11,041	466 (4.2%)	About 182	21 streams for a total of 167 miles

FWP estimated westslope cutthroat trout occupied 466 miles of stream in the upper Missouri River basin in 2008 (4.2% of historic range). Twenty-one projects were completed (or near completion) between 2008 and 2016, which added 167 miles of occupied stream. If occupied stream mileage was not significantly lost elsewhere, FWP estimates 633 miles of stream occupied by WCT (5.7% of historic range).

In the Big Hole drainage, FWP has conducted 11 projects like the one proposed in French Creek from 2011-2017. The projects are in various stages of completion. Below is a list of these streams and their status:

- Cherry Creek: Eleven miles of Cherry Creek including Cherry and Granite lakes were treated in 2011. The stream was electrofished in 2012 and no non-native fish were detected at that time and the stream and lakes were restocked over the next 3 years from westslope cutthroat eggs collected from 7 different populations across the Big Hole. In 2015, additional electrofishing was done in the creek to monitor the recovery of the cutthroat and brook trout were detected. Three adult brook trout and a handful of age-0 brook trout were captured from the middle reaches of the creek. It appears that a small number (5 to be exact) of juvenile brook trout survived the first treatment in an area of multiple springs. These fish were not detected with electrofishing the following year and eventually reproduced. In 2016, the stocked cutthroat were captured and moved upstream or to a different location and the stream was treated with rotenone. The stream was treated again in 2017. It will be monitored in 2018 with EDNA to determine if brook trout have been eliminated. If so, the stream will be restocked with eggs from Cherry and Granite lakes. The cutthroat trout introduced to the lakes and upper 3 miles of the stream are thriving. Fish in the lakes are up to 4 pounds.
- McVey Creek: Eleven miles of McVey Creek were also treated in 2011. Prior to treatment 160 westslope cutthroat trout were salvaged from the stream and held in fishless tributary. These fish were released to the stream 48 hours after treatment. No brook trout have been detected in McVey Creek in multiple electrofishing sections over multiple years. The 160 salvaged cutthroat trout have expanded to fill the entire 11 miles of stream. Westslope cutthroat density was nearly equal to that of brook trout (53 brook trout prior to removal

and 43 cutthroat) after only 4 years and there were no cutthroat trout present in this particular reach of stream prior to brook trout removal.

- N Fk Doolittle Creek: Brook trout were removed from 3 miles of the North Fork of Doolittle Creek in 2013. Westslope cutthroat trout from the South Fork of Doolittle Creek have been used to repopulate this stream (see also Comment 39).
- York Gulch: Three miles of York Gulch were treated in 2013 to remove brook trout. Prior to removal, approximately 60 cutthroat trout were salvage and placed into York Pond. Theses salvaged fish were spawned in 2015, 2016 and 2017 and the fertilized eggs were reintroduced to York Gulch.
- Six Mile Creek: Three miles of Sixmile Creek on the Mount Haggin Wildlife Management Area were treated with rotenone in 2013 to remove brook trout. The stream was treated again in 2014. Fertilized eggs from Cherry and Granite lakes have been stocked into the stream in beginning in 2017 and will continue for 2 more years.
- West Fork Mudd Creek: Three miles of the West Fork Mudd Creek were treated in 2014 and again in 2015 to remove brook trout. Westslope cutthroat trout from Rabbia Creek (a stream in the headwaters of the Wise River) were used to repopulate the stream.
- Pintler Creek: Eleven miles of Pintler Creek were treated with rotenone in 2015 including Oreamnos Lake. The lake was restocked with triploid fish from the Anaconda hatchery in 2016. The stream was scheduled to be restocked with eggs from Cherry and Granite lakes in 2017 but high egg mortality lead to no fish or eggs being reintroduced to the stream. Eggs will be reintroduced to Pintler Creek in 2018. Approximately 10,000 eggs have already been collected for this purpose and will be transported to the stream in July.
- Van Houten Lake: Van Houten Lake was treated with rotenone in 2015 to remove white and longnose suckers. Westslope cutthroat trout and Arctic grayling were introduced from 2016-2018. The cutthroat trout are up to 18 inches and 2 pounds and the grayling are 14 inches.
- Schultz Creek was treated for 3 miles in 2015 and again in 2016 to remove Yellowstone x westslope cutthroat trout hybrids. Fish from Plimpton Creek and Hellroaring Creek were imported to the stream in 2017.
- Bender Creek: Four miles of Bender Creek were treated in 2017. Prior to treatment 60 westslope cutthroat trout were salvaged from the stream and held in a fishless tributary stream. These fish were released to the stream. Bender Creek will be retreated in 2018.
- Long Branch Creek: Six miles of Long Branch Creek were treated in 2016 to remove rainbow and Yellowstone cutthroat trout. The stream will be retreated in 2018 and westslope cutthroat trout and grayling will be restocked to the stream beginning in 2019.

Important lessons have been learned and technology has significantly advanced since our first project in the Big Hole on Cherry Creek near Melrose in 2011. Because of the risk of missing only a small number of fish with a single treatment, now all stream treatments are done a minimum of 2 times in consecutive years. This allows fish, if missed in the initial treatment, a year to grow and move into habitats where they will be more likely to be exposed to rotenone treated water. Additionally, the advancement of DNA detection in waters has greatly increased our ability to detect fish at very low densities. Environmental DNA (EDNA) can be collected from streams and lakes and the presence of fish at very low densities can be detected when electrofishing can potentially fail to detect the fish, as happened in Cherry Creek. Cherry Creek has not been a failure. It has taken longer than FWP originally planned to remove brook trout and FWP has learned important lessons, but the cutthroat trout in the upper stream and lakes are thriving. Once brook trout have been completely removed, eggs from westslope cutthroat in the headwater lakes will be introduced and the fishery will be on its way to full restoration.

French Creek is a large watershed and the largest project in the Big Hole drainage. It is not, however, the largest project of this sort done in Montana. Cherry Creek on the Madison was over 60 miles of stream. Brook and rainbow trout were successfully removed from this stream and westslope restored. Although French Creek is large and has complex habitat, FWP is confident that non-native fish can be completely removed, and that native fish will thrive.

Comment 18b. *How long does it take to get a fishery back once fish have been removed? FWP says it will take 3-5 years to re-establish a fishery in French Creek once fish are removed*.

First, it must be understood what FWP means when we say that a fishery is “established”. The long-term goal of all native fish restoration projects is to have self-reproducing and sustaining population of fish. FWP does not consider a native fishery to be re-established until the fishery reaches this state. Fish will be stocked in French Creek as soon as non-native fish are verified to be completely removed; however, this does not mean the fishery is fully established. Westslope cutthroat trout females do not begin to spawn until they are at least 3 years old and most spawn at age-4. Therefore, it takes 3-4 years after initial introduction to verify that the fish are naturally reproducing, and the population is becoming self-sustaining. Arctic grayling females also generally begin spawning at 3 years old. FWP plans to re-introduce Arctic grayling and westslope cutthroat trout for a minimum of 3-5 years after fish removal are complete. The fish will then be allowed to reproduce naturally on their own and the population will be monitored. Therefore, even though fish will be introduced as soon as non-native fish are removed, FWP will not consider the fishery to be fully established for a minimum of 3-5 years. FWP may also initially introduce larger westslope cutthroat trout and Arctic grayling to jump start the fishery and provide fish for anglers to catch as introduced fish grow to the size that people can catch. These fish would either be sterile triploid fish or Big Hole origin fish from wild brood sources.

Over the past 6 years FWP has established 3 wild brood lakes for westslope cutthroat in the Big Hole drainage. The sources of fish for these wild brood lakes includes various streams in the Big Hole drainage. FWP is able to collect between 20,000 and 50,000 eggs annually from these sources to be used in repopulating the waters that are being restored to native species. Two Arctic grayling brood sources are maintained in SW Montana lakes. These lakes have been populated by wild fish from the Big Hole River. FWP is able to collect between 200,000 and 1,000,000 eggs annually from these source for use in restoration projects. The eggs are typically incubated on the streams where they are being introduced.

Comment 19b. *What about the native fish in French Creek, will they be salvaged, or will they be reintroduced after fish removals are complete?*

The native fish in French Creek and its tributaries include: Rocky Mountain sculpin, longnose sucker, white sucker, longnose dace and mountain whitefish. Currently, the plan is to not salvage these fish prior to removal because of the logistics involved in salvaging fish over such a large scale. Rather, the native fish listed above would be imported from Deep Creek into French Creek once non-native fish removal is completed.

Comment 20b. *How will FWP determine success in French Creek? What will happen if success is not achieved, will the non-native fish be reintroduced?*

There would be 2 main milestones of success for the French Creek restoration project; the first is the removal of non-native fish. French Creek and its tributaries will be treated with rotenone a minimum of 2 consecutive years. The year following the second treatment, EDNA test will be done in French Creek and all of its tributaries. EDNA testing consists of collecting and filtering water from the stream. If the DNA of non-native fish is present it is captured on the filter and detected in the laboratory. The technique is incredibly sensitive and can detect a single fish in the stream. Results of these tests will dictate if a 3rd treatment is necessary. If non-native fish are detected, FWP will likely be able to do a smaller scale treatment to remove fish from only where they were detected rather than having to treat the whole drainage. EDNA techniques will also be coupled with electrofishing surveys to verify that all non-native fish have been removed. Once these 2 techniques confirm that non-native fish have been removed, the first milestone will have been met.

The second milestone will be the completion of the reintroduction efforts and the establishment of the native fishery. This will take 3-5 years of reintroduction efforts before the fish begin spawning on their own and fish populations would become self-sustaining (see Comment 18). FWP will monitor the progress of introduction efforts and eventual spawning through the established monitoring section in French Creek and its tributary streams (see Comment 22). Based on other restoration projects, FWP is fully confident that westslope cutthroat trout will thrive in French Creek. The success of grayling introduction is less certain because Arctic grayling restoration projects involving the removal of non-native fish in a tributary stream is innovative. Only one other project involving non-native fish removal and subsequent grayling introduction has been performed in Grayling Creek in Yellowstone National Park. Initial findings from this project are hopeful as the introduced grayling have survived and remained in the stream but are not yet old enough to reproduce on their own. Arctic grayling were introduced to upper Ruby River in Montana and have established a self-sustaining population in that stream. The upper Ruby River has habitat similar to French Creek; however, no non-native fish removal was performed in the Ruby River. With the results of these previous Arctic grayling introductions, FWP is hopeful that grayling introduction to French Creek will also be successful.

Given FWP's investment in the French Creek drainage to restore native fish, every effort will be made to remove non-native fish re-establish westslope cutthroat trout and Arctic grayling. FWP is confident it can achieve this goal.

Comment 21b. *FWP will stock hatchery westslope cutthroat trout and grayling into French Creek?*

The westslope cutthroat trout that would be stocked into French Creek and its tributaries following fish removal will come from the 3 brood lakes established in the Big Hole and founded from no fewer than 7 wild populations of cutthroat in the Big Hole drainage. The eggs collected from these wild sources will be reared in the Washoe Park Hatchery in Anaconda until the eyed stage and introduced as eye eggs into remote stream side incubators or reared to the fry stage and introduced as fry. Age-1 (7 inch) triploid (reproductively sterile) fish from the Washoe Hatchery may also be introduced to provide a catchable sized fish while the juvenile wild fish grow. No fertile "hatchery" fish will be introduced to French Creek.

The Arctic grayling that would be introduced to French Creek would come from the two captive brood sources. These brood lakes are populated with fish from the Big Hole River. These brood sources do not support natural reproduction allowing FWP to manage densities and genetics of the brood sources. FWP does not maintain a brood stock of graying in any hatchery in the state.

Comment Category 4B. Fisheries and aquatic data for French Creek

Comment 22b. *What fisheries data is available for French Creek and its tributaries? What are the genetics of cutthroat in French Creek? What is the stocking history in French Creek?*

The most recent fisheries data (2012-2016) for French Creek are published in an FWP report (Olsen 2017). Below is a table taken from that most recent report summarizing the data collected from French Creek and its tributaries. Previous sampling in the French Creek drainage was done in the early 1980's (Oswald 1983). Habitat conditions have improved markedly from those observed by Oswald in the early 1980's shortly after the acquisition of the Mount Haggin WMA and fish numbers have increased. Fish numbers, however, have remained low in the lower reaches of French Creek likely due to impacts of mining upstream and high sediment loads in this reach of stream.

Table 1. Fisheries survey data from French Creek and tributaries during 2012 and 2016 where Length = the length of the section, L is fish length and W = fish weight. The fish species sampled were: EB = brook trout, RB = rainbow trout, LL = brown trout, WCT = westslope cutthroat trout, MWF = mountain whitefish, LSU = longnose sucker, WSU = white sucker R Cot = Rocky Mountain sculpin and PRL = western pearlshell mussels. Section Length is in feet.

Section (Length)		Latitude	Longitude	Survey Type	Species (# sampled)	Pop Est/mi (95% CI)	Avg L (in) (range)	Avg W (lbs) (range)
French 1 (10,454)		45.94126	113.07418	Mark-Recap	EB (161)	162 (164-160)	7.8 (4.5-14.0)	0.19 (0.04-1.06)
					RB (269)	189 (191-187)	6.8 (4.2-16.0)	0.14 (0.02-1.20)
					LL (15)		10.6 (5.2-18.1)	0.67 (0.06-2.03)
					MWF (70)		9.2 (6.4-16.4)	0.30 (0.06-1.50)
					LSU (102)		6.3 (3.0-9.5)	0.10 (0.01-0.27)
					WSU (3)		5.2 (3.6-7.5)	0.06 (0.02-0.14)
					R Cot			
French 2	(st)	45.92945	113.08620	Mussel	PRL (3)		2.1 (1.25-2.5)	
(800)	(end)	45.93023	113.08445					

Section (Length)	Latitude	Longitude	Survey Type	Species (# sampled)	Pop Est/mi (95% CI)	Avg L (in) (range)	Avg W (lbs) (range)
French Gul 1 2015 (800)	45.95284	113.03260	1-Pass	EB (63) R Cot (84)		4.8 (1.2-8.5)	
French Gul 1 2016 (800)	45.95284	113.03260	1-Pass	EB (143) R Cot (30) RB (3)		3.9 (1.2-9.4) 2.5 (1.4-3.6) 5.2 (4.9-5.7)	
French Gulch 2 (st) (304) (end)	45.95657 45.95693	113.02104 113.01998	2-Pass	EB (64) R Cot (23)	1251 (1045-1455) 418 (363-473)	3.9 (1.2-7.6) 2.5 (1.1-4.5)	
French Gulch 3 (st) (334) (end)	45.95818 45.95848	113.01631 113.01508	2-Pass	EB (35) R Cot (11)	590 (509-672) 201 (160-242)	3.8 (1.1-6.5) 2.3 (1.2-3.1)	
French Gulch 4 (st) (1,590) (end)	45.94603 45.94458	112.99591 112.99477	1-Pass	Fishless			
French Gulch 5	45.93941	112.98466	1-Pass	Fishless			
Moose 1 (st) (518) (end)	45.94882 45.94882	113.0396 113.0396	1-Pass	EB (92) R Cot (13)		5.5 (2.0-9.5) 3.2 (2.2-4.8)	
California 1 (4,488)	45.20203	113.37159	Mark-Recap	EB (321) RB (248) LSU (14) R Cot	642 (647-637) 342 (344-340)	7.1 (3.4-11.7) 5.5 (3.3-17.0) 6.9 (5.6-9.2)	0.14 (0.01-0.54) 0.07 (0.01-1.97) 0.12 (0.06-0.23)
American 1 (500)	45.96002	112.97920	1-Pass	EB (26) WCT (3)			
American 2 (850)	45.94295	112.95177	1-Pass	WCT (30)		6.1 (4.5-7.5)	
American 3 (1,000)	45.93762	112.94459	1-Pass	Fishless			
Crooked John 1 (st) (2600) (end)	45.99069 45.98854	112.98167 112.97346	1-Pass	EB			
Crooked John 2	45.98187	112.96744	1-Pass	Fishless			
Sixmile 1 (4,200)	46.00237	113.03741	1-Pass	EB (127) WCT (1)		 4.7	
E Fk Sixmile (2,800)	46.01928	113.03742	1-Pass	EB (11)			
W Fk Sixmile (1,270)	46.03085	113.03638	1-Pass	EB (15)			
Little California (st) (4,960) (end)	45.97352 45.97184	112.98247 112.96431	1-Pass	EB (4)			
Unnamed (st) (800) (end)	45.99910 45.99582	112.96881 112.96433	1-Pass	EB			

The only genetic samples collected from the French Creek drainage have been from Moose Creek (5 fish collected in 1989, 100% westslope cutthroat trout, but now the population is extirpated), Sixmile Creek (samples collected in 2012, hybridized with rainbow trout) and American Creek (samples collected in 2015, 100% westslope cutthroat trout). No other cutthroat trout were encountered in the stream during any of the surveys conducted and listed in Table 1.

Stocking records for most waters in Montana are scant before the 1930's. Prior to this time, fish were often distributed by the US Fish Commission to local sportsman's groups to stock and the location of stockings were either not recorded or not preserved. The known stocking records for French Creek show that cutthroat trout was the only species stocked and that occurred in 1946. California Creek was stocked with over 1 million fish from 1928-1952. These fish consisted of grayling, cutthroat trout and rainbow trout. American Creek was stocked with over 60,000 cutthroat trout from 1934-1952 and 10,000 rainbow trout were stocked in 1934. There are no other stocking records for French Creek or any of its tributaries. It was only in the latter half of the 20th century that a distinction was made between westslope and Yellowstone cutthroat trout; however, it is thought that that most "cutthroat trout" stocked prior to this distinction were Yellowstone cutthroat. There are no stocking records of brook trout in the drainage.

Comment 23b. *Has FWP obtained population info on non-fish aquatic species like pearlshell mussels. Will FWP monitor non-fish species during project to determine impacts?*

Western Pearlshell mussel monitoring has been performed in lower French Creek. One 800 ft survey in French Creek revealed only 3 mussels (Olsen 2017). Additional surveys farther upstream where water quality is better have found more mussels. Pearlshell mussels have been demonstrated to be highly resistant to rotenone. When pearlshell mussels were exposed to 1 ppm rotenone in the West Fork of Mudd Creek in the Big Hole drainage there were no apparent impacts on the mussels 24 and 72 hours later. Similar studies have reported high tolerances of mussels to rotenone (see EA page 70).

According to FWP's Piscicide Policy aquatic invertebrate sample is to be done a minimum of 1 year before the planned treatment and 1 year after the treatment is complete to monitor the recovery of aquatic invertebrates. This policy will be adhered to for French Creek. In addition, aquatic invertebrates are being monitoring in conjunctions with the other restoration efforts ongoing in French Gulch and Moose Creek and upper California Creek.

Comment Category 5B. Public Process

Comment 24b. *Local people did not know about French Creek project. FWP should disclose who was on the original mailing list for the French Creek EA released for comment in 2016. French Creek project is poorly planned and FWP has done a poor job involving the public.*

FWP notes oversights in the original public review process for this project; however, the project was properly noticed in the paper and landowners within the immediate project were notified. Since these initial events, FWP has made every effort to involve the public and give as many people who have an interest in the project the opportunity to comment and express their opinion. FWP has also made every effort to answer questions and conduct additional studies where data and information were lacking. The oversights made in the public process include: First, was the exclusion of the local landowners within and immediately downstream of the project area from the initial mailing for comment on the EA. FWP attempted to rectify this error by extending the comment period an additional 30 days to the local landowners that did not receive the initial mailing. These landowners included: Phil Ralston, Martin White, Jerry Lussie, Jim Schmeller, Keith and Jean Rankin, Richard Seddon and Haddox Ventures. The second error was not casting a wide enough net with the initial environmental review to include the landowners surrounding the project area and not just those within the project area. FWP did not meet personally with Martin White who resides downstream of the proposed fish barrier. Lastly, a public meeting was not held to discuss the original EA and accept public comment (note: the reason a public meeting was not held was the lack of comments received).

Below is the list that the original EA notice was mailed to:

Governor's Office, Tim Baker, State Capitol, Room 204, P.O. Box 200801, Helena, MT 59620-0801
Environmental Quality Council, State Capitol, Room 106, P.O. Box 201704, Helena, MT 59620-1704
Dept. of Environmental Quality, Metcalf Building, P.O. Box 200901, Helena, MT 59620-0901
Dept. of Natural Resources & Conservation, P.O. Box 201601, Helena, MT 59620-1601
Montana Fish, Wildlife & Parks:
Director's Office Parks Division Lands Section FWP Commissioners
Fisheries Division Legal Unit Wildlife Division Design & Construction
MT Historical Society, State Historic Preservation Office, P.O. Box 201202, Helena, MT 59620-1202
MT State Parks Association, P.O. Box 699, Billings, MT 59103
MT State Library, 1515 E. Sixth Ave., P.O. Box 201800, Helena, MT 59620
James Jensen, Montana Environmental Information Center, P.O. Box 1184, Helena, MT 59624
Janet Ellis, Montana Audubon Council, P.O. Box 595, Helena, MT 59624
George Ochenski, P.O. Box 689, Helena, MT 59624
Jerry DiMarco, P.O. Box 1571, Bozeman, MT 59771
Montana Wildlife Federation, P.O. Box 1175, Helena, MT 59624
Wayne Hurst, P.O. Box 728, Libby, MT 59923
Jack Jones, 3014 Irene St., Butte, MT 59701
Jack Atcheson, 2309 Hancock Avenue, Butte MT 59701
U.S. Army Corp of Engineers, Helena
U.S. Fish and Wildlife Service, Helena
U.S. Fish and Wildlife Service, 420 Barrett Street, Dillon, MT 59725
Big Hole Watershed Committee, P.O. Box 931, Butte, MT 59703
Montana Trout Unlimited, P.O. Box 7186, Missoula, MT 59807
Dan Vermillion, FWP Commissioner, Livingston MT
Earnest and Colleen Bacon, 2215 Fishtrap Creek Road, Wisdom, MT 59761
Dept. of Natural Resources and Conservation, 730 N. Montana Street, Dillon, MT 59725-9424
George Grant Chapter of Trout Unlimited, P.O. Box 563, Butte, MT 59703
Skyline Sportsmen, P.O. Box 173, Butte, MT 59703
Anaconda Sportsmen, 2 Cherry, Anaconda, MT 59711
E.T. Bud Moran, Chairman CSKT, PO Box 278, Pablo, MT 59855
Al Lubeck, 2710 Amherst, Ave, Butte, MT 59701
Adam Rissien, ORV Coordinator, Wildands CPR, PO Box 7516, Missoula, MT 59807
Josiah Pinkham, Tribal Arch., Nez Perce Tribe, PO Box 365, Lapwai, ID 83540
John and Sandy Gordon, Juniper Acres Rd, Butte, MT, 59750

Phil Ralston, 54289 MT Highway 43, Wise River, MT 59762
Martin White, 3308 46th Ave. SE, Mandan ND, 58554-4730
Jerry Lussie, 305 Main Street, Anaconda, MT 59711
Jim Schmeller, Montana Living Trust, 4935 Everett Rd, Akron, OH 44333
Kieth and Jean Rankin, P.O. Box 28, Anaconda, MT 59711
Richard Seddon, 2017 Harrison Ave# 237, Butte, MT 59701
Haddox Ventures LLC, 9141 Briar Forest Dr., Huston, TX 77024

Since the initial EA, FWP has made greater efforts to solicit and respond to public comments. FWP has participated in 2 public meeting, has corroborated in several newspaper stories and generated a Supplemental Analysis and reopened the native fish restoration portion of the original EA to public comment and extended the comment period to 60 days. Additional studies were conducted to determine the potential impacts on downstream landowners of the fish barrier failing. FWP gave multiple presentations at the Anaconda and Skyline Sportsmen's clubs, George Grant Trout Unlimited and the Big Hole Watershed Committee meetings. FWP staff met personally with many of the landowners in the drainage.

Comment 25b. *FWP expressed in my home that my grandkids could not go near the water for 1 year after application of rotenone and states now they didn't say this.*

FWP apologizes for any miscommunication that may have happened during this visit to your home. The rotenone label requires that when applied at the target concentration of 1 ppm the public be restricted from accessing the stream during product application. No rotenone will be applied downstream of the fish barrier and all rotenone that passes over the fish barrier will be neutralized using potassium permanganate. People will not be excluded from areas treated with rotenone for longer than the label requires.

Comment 26b. *FWP should do an EIS rather than an EA.*

In 2016 FWP concluded the following: "After considering the potential impacts of the proposed action and possible mitigation measures, FWP has determined that an Environmental Impact Statement is not warranted. The impacts of mining and native fish restoration as described in this document are minor and/or temporary and mitigation for many of the impacts is possible. The primary negative impacts as a result of this project are temporary disturbance related to construction activities and a temporary loss of fish and reduction in aquatic invertebrate abundance as a result of toxic effects of rotenone. Impacts to aquatic invertebrates have been shown to be short term (1-2 years) and minor and invertebrate communities are very resilient to disturbances such as treatment with rotenone. Further, the benefit to native WCT and Arctic grayling, both species in need of conservation, would balance the potential minor and short-term impacts to other species."

Considering the comments received during this Supplemental Analysis and additional studies performed and summarized in the Supplemental EA, FWP maintains that the impacts of the proposed project are minor and short term and, in many cases, can be mitigated. Therefore, the Environmental Assessment remains the appropriate level of environmental review.

Comment Category 6B: Fish Barrier

Comment 27b: *Does FWP have the necessary permits for the fish barrier including Army Corps of Engineers 404, 310, County Floodplain permit.*

FWP has applied for the following permits: USACE 404/401, SPA 124, County Floodplain Permit and MT DEQ 318. Only the SPA 124 has been received. No work that requires a permit will be initiated before the permit is obtained.

Comment 28b. *What are the costs of project? Who are the funders? Can private funders be disclosed?*

The table below includes all funding for the French Creek fish barrier and their sources. There are also 2 additional pending grants for the project totaling an additional $15,000.

Montana Department of Transportation	$60,000.00
Future Fishreis Improment Program	$73,000.00
Bring Back the Natives (NFWF)	$32,500.00
US Forest Service RAC Funds	$15,000.00
Future Fisheries Improvement 2	$72,000.00
Western Native Trout Intitiative	$41,300.00
State Wildlife Grants	$15,000.00
Northwest Energy	$30,000.00
Arctic Grayling Recovery Program	$10,000.00
BLM Grayling	$25,000.00
George Grant Chapter Trout Unlimited	$10,000.00
Sub Total	$383,800.00

The total fish barrier projected cost is $385,018

Comment 29b. *Will annual funding be designated toward the project to ensure integrity of the planted native and fish barrier?*

Yes. The fish barrier will be inspected annually. FWP will seek the assistance of the DNRC who regulates larger dams for these inspections. FWP will monitor the fishery periodically after the native fish are reintroduced to determine if stocked fish are surviving and eventually reproducing. FWP will also compare pre-treatment fish density and size to post treatment to ensure that a quality fishery results. Survey will be most intense in years 4, 5 and 6 after fish reintroduction to determine if the native fish are reproducing. FWP has not conducted any projects where native fish introduced after non-native fish have been removed did not succeed and reproduce on their own. Additional funding for these surveys is not necessary as they will be conducted by the local biologist’s crew and volunteers.

Comment Category 7B: General Comments

Comment 30b. *Will WCT and AG be able to deal with the potential impacts of climate change? How will this impact French Creek?*

The coldwater requirements for westslope cutthroat trout and Arctic grayling are similar to the requirements of other coldwater fish species currently present in French Creek. Restoration efforts in French Creek have also included several habitat projects. The goal of these projects was to increase groundwater storage, reduce sediment loading and increase riparian vegetation. This focus on habitat as well as restoring native species will provide the best buffer possible against the potential effects of climate change on any salmonids in the drainage.

Comment 31b. *Who will benefit from this project? Purists who want 1 species of fish?*

All Montana's will benefit from this project. There are hundreds of places an angler can go in the Big Hole and catch brook trout. The places an angler can go and catch a westslope cutthroat trout or grayling are very rare. FWP feels that native fish restoration can occur in a balanced manner with non-native fish management where non-native trout will continue to occupy 80% of the habitat across the landscape and native trout will eventually occupy 20%. This balanced management approach is being applied on Mount Haggin. Deep Creek and all its tributaries will be managed for non-native brook, rainbow and brown trout along with the native Arctic grayling that migrate in from the Big Hole River, while French Creek will be managed for native westslope cutthroat trout and Arctic grayling. Creating native fisheries will add diversity to the angling landscape and provide additional opportunities to catch a variety of fish species.

These native fish restoration project will ensure that our native cutthroat and grayling do not go extinct. The fish will be conserved for future generations to enjoy. Local extirpations of westslope cutthroat trout populations have been occurring on a regular basis for the past 100 years until now there are only a few small isolated populations left. If projects like these are not conducted the species will disappear. Federal listing under the Endangered Species Act will likely occur and local control of fisheries management and other land management activities will shift to the Federal Government.

Comment 32b. *What will be the effects of native fish restoration on water rights and water right holders? Water right holders have not given permission for rotenone to be applied to water.*

FWP owns all of the surface water rights within the project area. Water rights within or outside the proposed project area will not be affected by the project.

Comment 33b. *FWP is not allowed access through John and Sandy Gordon's property.*

FWP will not enter the Gordon's property without permission.

Comment 34b. *Cutthroat are harder to catch and do not taste as good as brook trout.*

Generally cutthroat trout are thought to be easier to catch than brook trout although FWP is not aware of any data or studies that have documented this. Fish flavor tends to be related to the diet of the particular fish. Cutthroat trout and Arctic grayling in French Creek will likely eat the same things as the current brook and rainbow trout and therefore should taste similar.

Comment 35b. *Why would I want cutthroat if we can't keep them to eat?*

Current fishing regulations in the Central Fishing District allow 1 cutthroat from streams to be harvested. Once it is verified that westslope cutthroat in French Creek are reproducing and filling the habitat and can sustain higher harvest, FWP will propose an exemption to the existing regulations and allow a higher harvest limit for cutthroat in French Creek.

Comment 36b. *FWP should be spending is resources to construct dams in the Big Hole to aid in maintaining flows in dry years.*

FWP has worked cooperatively with landowners and the Big Hole Watershed Committee to implement the Big Hole Drought Management Plan. This plan relies on volunteer irrigation reductions to meet habitat-based water flow targets. It has been effective at keeping flow in the river and avoiding fish kills and dry river beds which occurred in the 1980's. FWP has been working cooperatively with partners such as the Big Hole Watershed Committee to increase natural water storage in wetlands which can release flows to streams as flows drop. Much of this work has been focused on Mt Haggin and in the French Creek drainage.

Construction of a reservoir in the Big Hole basin would be monumental task. Repeated attempts have been made at getting something like this done, but the obstacles have yet to be surmounted. These obstacles include but are not limited to the cost of the dam, maintenance and liability for the structure, water rights and ensuring the water stays instream. The Big Hole is closed to new appropriations of water and a dam and storage would be a new appropriation of water. Such a large project would require great political will including the finding of funding, changing of existing laws and cooperation of landowners.

Comment 37b. *Can the existing fish be removed from the stream and released elsewhere rather than being killed?*

Yes, it may be possible to move some fish below the fish barrier prior to treatment with rotenone. Moving fish would require road access to the stream. Only a limited number of fish can be carried on the electrofishing boat before fish become oxygen stressed. It may be possible to move fish immediately upstream of the fish barrier and in the vicinity of the Highway 569 bridges over French and California creeks. This effort would require significant volunteer help. If volunteers are made available FWP is agreeable to move fish downstream of the fish barrier.

Comment 38b. In *the supplemental Analysis Report under Environmental Review Section, was there supposed to be a comment 3b under the AIR section (page 17).*

No, this should have been changes to refer to Comment 3a which was about temporary exhaust fumes coming from machinery constructing the road.

Comment 39b. *Martin White requested a list of streams where cutthroat restoration has occurred where there are now fish over 2 pounds.*

The following response was prepared and send to him:

At the request of Martin White, Montana Fish, Wildlife & Parks (MFWP) has put together a list of waters where westslope cutthroat trout restoration has been performed and where there are now fish over 2 pounds. To preface this response, it was specifically requested that a list of streams be compiled that have been restored that have fish over 2 pounds. It is important to understand the biology of small streams which is typically where westslope cutthroat trout restoration has occurred. Very few, if any, small streams supported fish before restoration that were over 2 pounds. The small size of these streams, typical high-elevation temperature profiles, limited food and limited habitat generally do not result in fish of this size. Occasionally small streams that are connected to lakes or that flow into larger rivers will have of this size as they temporarily migrate into the streams to spawn, seek cooler water or take advantage of seasonally available food resources. None of the 11 streams in the Big Hole drainage restored to westslope cutthroat trout had fish in them other than cutthroat prior to restoration that were over 12 inches long (approximately 0.6 pounds). Below is a list of the streams in the Big Hole and the maximum fish size in each of these streams prior to restoration. None of these streams after restoration have cutthroat in them over 2 pounds, but none of them had trout in them prior to restoration over 2 pounds.

Stream Name	Species 1	Max length (inches)	Species 2	Max Length (inches)
Cherry Creek	Brook trout	7.2	Hybrid cutthroat	12.3
McVey Creek	Brook trout	8.5		
N Fk Doolittle Creek	Brook trout	No data		
W Fk Mudd Creek	Brook trout	8.6		
York Gulch	Brook trout	6.6		
Twelvemile Creek	Brook trout	7.7		
Sixmile Creek	Brook trout	6.5		
S Fk N Fk Divide	Brook trout	9.4		
Pintler Creek	Rainbow trout	10.2		
Schultz Creek	Yellowstone cutthroat	No data		
Bender Creek	Brook trout	8.6		

Below is a list of lakes that we have restored that have fish over 2 pounds and photos documenting fish size (if available):

Oreamnos Lake, fish removed in 2013 and restocked in 2014. FWP does not have photos from Oreamnos Lake, just fisherman reports.

Cherry and Granite lakes in Cherry Creek drainage, fish removed in 2011 and restocked 2012-2015

Fish from Granite Lake in 2016 that was stocked in 2014 as a 7-inch fish and is approximately 17 inches and 2 pounds 3 years later.

Same age class of fish from Granite Lake in 2017 as a 5-year-old (approximately 20 inches and 4 pounds).

Van Houten Lake: Fish removed in 2015 and restocked 2016-2017, fish are 2 pounds this year after 2 years of being in the lake. Fish were stocked in 2016 at 7 inches, were 13-15 inches in 2017 and 14-18 inches in spring 2018.

Westslope cutthroat from Van Houten Lake after 1 year in the lake. Fish was stocked at 7 inches and in 1 year has grown to 13 inches.

Westslope cutthroat trout (17 inches long and 2 pounds) in 2018 from Van Houten Lake treated in 2016.

Westslope cutthroat trout from Van Houten Lake (16.8 inches and 2 pounds)

Arctic grayling from Van Houten Lake (13 inches and 1 pound) in 2018.

York Pond

York Pond was not treated with rotenone, but York Gulch was and the fish from York Gulch were salvaged and introduced to the fishless pond prior to treatment. Those fish now are 20+ inches and 4 pounds.

McVey Creek: McVey Creek was treated with rotenone in 2011. Approximately 160 native westslope cutthroat trout were salvaged from the stream prior to removal of brook trout. These fish were returned to the 11 miles of McVey Creek 2 days after the treatment ended. They have since filled the entire stream. Formerly there were not cutthroat trout in the lower 7 miles of stream. Now there are cutthroat throughout the entire system. There is a small pond upstream of the fish barrier, similar to what would be present on French Creek. The fish have migrated all the way downstream from the forest (7 miles to the fish barrier) and are growing larger in the pond above the fish barrier than what we saw in the stream before or after the treatment. Fish were up to 15 inches as of last May and approximately 1.5 pounds.

Westslope cutthroat trout from the pond upstream of the McVey Creek fish barrier. Fish is 15 inches long and approximately 1.5 pounds.

Hound Creek Reservoir:

Hound Creek reservoir and Tyrell Creek were restored to WCT in 2008. Both westslope cutthroat trout and Arctic grayling were restocked into the reservoir. The system including the reservoir is publicly accessible and regularly is fished. Westslope over 2 pounds are common and grayling approaching 2 pounds are also present.

Arctic grayling from Hound Creek Reservoir restored to native species in 2008

Westslope cutthroat trout from Hound Creek Reservoir and creek upstream restored to native species.

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